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ACTIVITY, *Gonatodes humeralis* (diel act., cryptic beh., act. rel. to perch height) 32-43; *Cyprinodon variegatus* (at extreme temperatures) 77-87; *Kinosternon leucostomum* (home range act. area, aestiv. & nest sites, radiotelem.) 123-130; *Cophosaurus texanus* (thermal constraints in act. rel. to microhab. avail.) 725-737; *Cnemidophorus (lemniscatus, cryptus)* (diel pitns., compare popns. & unisex. sp. to sympat. parent sp.) 745-757.

AGE, *Etheostoma (Doration)* (*stigmaeum, jessiae*) (ontogen. traits as system. charcs.) 60-69; *Alligator mississippiensis* (rel. to survival during brief ice cover) 224-226; *Cretoxyrhina mantelli* (bands on vert. centra, fossil shark) 233-235; *Plethodon cinereus* (toler. of adults for juvs. in territ.) 410-414; *Rivulus marmoratus* (age-rel. gender changes, hermaph.) 596-600; *Cyclura nubila* (egg surv. rel. to matern. age) 766-776; *Trachemys scripta, Deirochelys reticularia* (using claws to age turtles) 842-845.

AMPULLAE OF LORENZINI, *Himantura signifer* (compar. to electroreceptors in freshwater stingray) 101-107.

ANDROPODUM, *Dermogenys* sp. (growth & dev.) 44-52.

BEHAVIOR, *Hexagrammos decagrammus* (male nest guarding, matern. of eggs) 9-15; *Gonatodes humeralis* (cryptic beh., sit-&wait pred.) 32-43; *Etheostoma (Doration)* (*stigmaeum, jessiae*) (mating & egg-laying, seas.) 60-69; *Plethodon cinereus* (funct. of scent-marking, territ.) 70-76; *Cyprinodon variegatus* (in extreme temperatures) 77-87; *Polypterus maculatus* (wiping beh. in tree frogs) 88-100; *Sceloporus grammicus* (hypoth. for diff. in therm. reg. in gravid fems.) 108-115; *Kinosternon leucostomum* (radiotelem. of home range, activ., aestiv. sites, nest. beh. & sites) 123-130; *Ctenosaura (melanosterna* n. sp., *bakeri*) (head-bobbing & territ. beh.) 138-150; *Oreochromis* (14 spp.) (spawning in fem. mouthbrooders) 188-190; *Ophedrys aestivus* (gravitidy red. crawl speed) 191-194; *Betta splendens* (male agon. resp. to computer simul. male) 195-199; *Alligator mississippiensis* (make air holes during brief ice cover) 224-226; *Rana (lessonae, esculenta = lessonae*  $\times$  *ridibunda*) (fem. mate choice in maint. hybrid sp. in popn.) 275-283; *Amphiprion (clarkii, ocellaris, periderion)* (beh. acclim. of anemonefish to anemones) 284-289; *Hyla versicolor* (calling rel. to energy sources, limits) 356-362; *Plethodon cinereus* (aspects of territ.) 410-414; *Anolis grahami* (response to video playback in wild) 421-423; *Eurycea wilderae* (aquat. larv. agon. & spacing beh. in lab) 439-443; *Physalaemus pustulosus* (light levels aff. female mate choice) 447-450; *Rana cf. blythi* (nesting, calls, mating, male-male aggres.) 464-465; *Crocodylus johnstoni* (aggres. aff. thermoreg. in wild) 549-557; *Emydura signata* (basking beh. not raise body temp.) 579-584; *Chiasmocleis leucosticta* (bubble nests, unique for anurans) 585-588; *Podarcis lilfordi* (lizard pollinator) 593-595; *Xenopus wittei* (mating in wild-caught frogs) 601-609; *Ophidion marginatum* (sounds during cshp., sonograms) 610-612; *Eumees laticeps* (antipred. beh. pitns. rel. to pred. orient.) 613-619; *Hemibarbus barbus* (spawning beh. in wild) 620-622; *Tropidurus itambere* (seas., gender diff., in home range, territ. defence) 623-628; *Batrachoseps (nigriventris, wrighti)* (commun. nests, lack parent. care) 697-705; *Ictalurus punctatus* (sound product., anat. of osteol. mech.) 777-790; *Gopherus agassizii* (chem. cues in burrow choice) 802-810; *Platysaurus capensis* (feeding on figs, choice experiments in wild) 811-818; *Staurotypus triporcatus, Kinosternon leucostomum* (diving & ventil. beh., sp. diff.) 834-839; *Dasyatis brevicaudata* (lat. line detects water jets like from clams) 881-883; *Chelydra serpentina* (juvs. use of tails in terrest. loc.) 884-887.

BIOGEOGRAPHY, *Sternotherus odoratus* (genet. diverg. w/in morph. homogen. widespread sp.) 16-21; *Agirostrodon piscivorus* (N. popn. large body size rel. to lipid reserves, reprod., hibern.) 53-59; *Ctenosaura (melanosterna* n. sp., *palearis, bakeri, oedirhina*) (explan. of present distrib.) 138-150; *Platymantis (pelewenensis, dorsalis, papuensis)* (proposed routes of ancestral migr.) 183-187; *Eurycea junaluska* (disjunct distrib., relict popns., low popn. dens.) 210-215; *Alligator mississippiensis* (rel. to beh. during brief ice cover) 224-226; *Pseudacris crucifer* (freeze toler. aff. geogr. distrib.) 260-264; *Trachemys scripta* (rel. to hatching, cold toler., depth of nests) 339-345; *Brycinus (kingsleyae, opisthototaenia)* (some sympat., possible hybrid.) 363-372; *Spicospina* n. gen. *flammeocerulea* n. sp. (relic sp., biogeogr. discus.) 373-381; *Neobatrachus (sudelli, centralis, kunapalar, aquilonius)* (of tetraploid spp., possible diploid origins) 680-689.

BLOOD, *Isurus oxyrinchus* (cardiovasc. physiol. in swimming sharks) 424-428.

CALLS, *Eleutherodactylus (Craugastor) pluvianorus* n. sp. (descript.) 151-157; *Leptolalax (heteropus, gracilis, dringi, hamidi* n. sp., *arayai* n. sp.) (descript., taxon. charcs.) 158-165; *Platymantis (pelewenensis, dorsalis, papuensis)* (phylogen. rels. btwn. spp., evid. from calls) 183-187; *Hyla versicolor* (energy source for calling mainly lipids) 356-362; *Spicospina* n. gen. *flammeocerulea* n. sp. (descript.) 373-381; *Eleutherodactylus skydmainos* n. sp. (descript., microhab.) 388-394; *Rana cf. blythi* (male & female) 464-465; *Boophis xerophilus* n. sp. (descript., sonogram) 572-578; *Xenopus wittei* (during mating, wild-caught frogs) 601-609; *Ophidion marginatum* (sounds of cshp., sonograms) 610-612; *Ictalurus punctatus* (anat. of sound product. mech. in catfish) 777-790.

CHIN GLANDS, *Gopherus agassizii* (chem. cues from chin glands in burrow choice) 802-810.

CHROMOSOMES, *Platymantis (pelewenensis, dorsalis,*

*papuensis*) (phylogen. rels. btwn. spp., evid. from kar.) 183-187; *Spicospina* n. gen. *flammeocerulea* n. sp. (kar.) 373-381; *Neobatrachus* (*sudelli*, *centralis*, *kunapalari*, *aquilonius*) (tetraploid spp. multiple origins) 680-689.

**COLORATION**, *Gonatodes humeralis* (sex. dimorph., color change in males) 32-43; *Etheostoma* (*Nothonotus*) *denoncourti* n. sp. (descript.) 116-122; *Ctenosaura* (*melanosterna* n. sp., *palearis*, *bakeri*, *oedirhina*) (disting. *C. melanosterna* from rels.) 138-150; *Eleutherodactylus* (*Craugastor*) (*fraudator*, *pluvicanorus* n. sp.) (disting. n. sp.) 151-157; *Leptolalax* (*heteropus*, *gracilis*, *dringi*, *hamidi* n. sp., *arayai* n. sp.) (disting. spp.) 158-165; *Platymantis* (*peleensis*, *dorsalis*, *papuensis*) (polychromisms shared, calls & kar. show rels. btwn. spp.) 183-187; *Eurycea junaluska* (disting. larvae from sympat. congeners) 210-215; *Brycinus* (*kingsleyae*, *opisthotaenia*) (disting. spp.) 363-372; *Hoplolatilus* *pohle* n. sp. (descript.) 382-387; *Eleutherodactylus* (*skydmายน* n. sp., *karcharias* n. sp.) (descript.) 388-394; *Lacerta agilis* (var. in male breeding colors) 456-460; *Etheostoma* (*fragi* n. comb., *uniporum* n. comb., *burri* n. sp., *spectabile*, *bison* n. sp., *tecumsehi* n. sp., *kantuckeense* n. sp.) (male breeding colors diagr.) 496-522; *Characidium orientale* n. sp. (in life) 531-548; *Crotaphytus collaris* (*collaris* (geogr. var. in sex. dichrom.) 565-571; *Boophis xerophilus* n. sp. (descript.) 572-578.

**COMPETITION**, *Plethodon cinereus* (scent-marking & territ. comp.) 70-76; *Desmognathus quadramaculatus*, *Eurycea wilderae* (comp. in pred.-reduced prey popn.) 131-137; *Oreochromis* (14 spp.) (sperm compet. elicited by fem. mouthbrooders) 188-190; *Betta splendens* (male agon. resp. to computer simul. male) 195-199; *Menidia* (*beryllina*, *peninsulae*, *clarkhubbsi*, *beryllina*  $\times$  *peninsulae*) (factors in abund., unisex-bisex. sp. complex) 249-259; *Rana* (*lessonae* = *lessonae*  $\times$  *ridibunda*) (male-male comp. aff. fem. mate choice) 275-283; *Eurycea wilderae* (agon. & spacing beh., aquat. larv. in lab) 439-443; *Rana* cf. *blythi* (male-male aggress. at nests) 464-465; *Crocodylus johnstoni* (for basking sites aff. thermoreg. in wild) 549-557.

**CONSERVATION**, *Gopherus agassizii* (genet. distinct popns., rel. to conserv. mgmnt.) 523-530.

**DENTITION**, *Lacerta lepida* (diet rel. to ontog. dental changes) 461-463; *Poeciliini* (*Limia*, *Pamphorichthys*, *Xiphophorus*, *Poecilia*, *Alfaro*, *Priapella*) (in clad. anal.) 663-679.

**DEVELOPMENT**, *Gramma loreto* (gonads, lack of protogyny) 22-31; *Dermogenys* sp. (testis & andropodium) 44-52; *Etheostoma* (*Doration*) (*stigmaeum*, *jessiae*) (ontogen. traits as system. charcs.) 60-69; *Dasyatis sabina* (spine replcmnt. in freshwater popn. same as marine popns.) 220-223; *Amphiprion* (*clarkii*, *ocellaris*, *periderion*) (of anemonefish protect. from anemones) 284-289; *Malaclemys terrapin* (egg size/clutch size var., test dev. plasticity theory) 290-297; *Lacerta lepida* (diet rel. to ontog. dental changes) 461-463; *Rivulus marmoratus* (of gonads, gender changes, hermaph.) 596-600; *Cyclura nubila* (incub. temp. aff. hatching growth) 766-776; *Sceloporus* (*scalaris*, *aeneus*, *undulatus*, *virgatus*) (eff. of low temps. on embryonic dev., high & low elev. popns. compared) 827-833.

**DISTRIBUTION**, *Rana* (*pretiosa*, *luteiventris*) (of cryptic spp.) 1-8; *Ctenosaura* (*melanosterna* n. sp., *palearis*, *bakeri*, *oedirhina*) (very restricted ranges, discuss. of biogeogr.) 138-150; *Eleutherodactylus* (*Craugastor*) (*fraudator*, *pluvicanorus* n. sp.) 151-157; *Eurycea junaluska* (disjunct, low popn. dens., endngd.) 210-215; *Alligator mississippiensis* (rel. to beh. during brief ice cover) 224-226; *Menidia* (*beryllina*, *peninsulae*, *clarkhubbsi*, *beryllina*  $\times$  *peninsulae*) (rel. to hab., unisex-bisex. sp. complex) 249-259; *Pseudacris crucifer* (freeze toler. aff. geogr. distrib.) 260-264; *Trachemys scripta* (rel. to hatching, cold toler., depth of nests) 339-345; *Brycinus* (*kingsleyae*, *opisthotaenia*) (some sympat. possible hybrid.) 363-372; *Spicospina* n. gen. *flammeocerulea* n. sp. (extremely limited) 373-381; *Eleutherodactylus* (*skydmายน* n. sp., *karcharias* n. sp.) 388-394; *Etheostoma* (*fragi* n. comb., *uniporum* n. comb., *burri* n. sp., *spectabile*, *bison* n. sp., *tecumsehi* n. sp., *kantuckeense* n. sp.) (of spp. complex) 496-522; *Gopherus agassizii* (of genet. distinct popns., rel. to conserv. mgmnt.) 523-530; *Characidium* (*serrano* n. sp., *orientale* n. sp., *occidentale* n. sp., *pterostictum*, *rachovii*, *tenue*, cf. *zebra*) (in S. Brazil) 531-548.

**ECOLOGY**, *Gonatodes humeralis* (geogr. var. in hab., size, morph. & prey size) 32-43; *Cyprinodon variegatus* (rel. to extreme temp. range toler.) 77-87; *Polyptedotes maculatus* (ecol. var. in wiping beh. in tree frogs) 88-100; *Kinosternon leucostomum* (hab. use, activ., home range, nest & aestiv. sites, radiotelem., biomass estim.) 123-130; *Desmognathus quadramaculatus*, *Eurycea wilderae* (eff. of pred. on prey life hist.) 131-137; *Eleutherodactylus* (*Craugastor*) (*fraudator*, *pluvicanorus* n. sp.) (notes) 151-157; *Urosaurus ornatus* (genet. diverg. btwn. isol. popns. rel. to ecol. var.) 174-178; *Tupinambis teguixin* (seas. var. in met. rate & water balance in trop. lizard) 200-203; *Pseudacris crucifer* (duration of freeze toler. import. in ecol.) 260-264; *Gopherus agassizii* (ecol. conserv. mgmnt. units sim. to genet. distinct popns.) 523-530; *Podarcis liofordi* (lizard pollinator) 593-595; *Cichla* (*intermedia*, *orinocensis*, *temensis*) (of sympat. piscivores, seas. diff. in repro., hab., diet) 690-696; freshwater stream fishes (natural var. in stream fish assemblages, eff. of drought, import. of data scale) 706-724; *Cnemidophorus* (*lemniscatus*, *cryptus*) (compare popns. & unisex. sp. to sympat. parent sp.) 745-757; *Sceloporus* (*scalaris*, *aeneus*, *undulatus*, *virgatus*) (eff. of low temps. on eggs, high & low elev. popns. compared) 827-833; *Agama* (*aculeata*, *planiceps*) (parasite load [gut nematodes] rel. to ecol.) 875-880.

**EGGS**, *Hexagrammos decagrammus* (size in ovaries, matern. of eggs in nest) 9-15; *Gonatodes humeralis* (in nests, size, stage, #, mult. clutches) 32-43;

*Ctenosaura melanosterna* n. sp. (# & size) 138–150; *Eleutherodactylus* (*Craugastor*) *fraudator* (size, #) 151–157; *Trachemys scripta elegans*, *Cheydya serpentina* (% containing twins, survival) 166–173; *Oreochromis* (14 spp.) (spawning beh. in fem. mouthbrooders) 188–190; *Malaclemys terrapin* (5-yr. egg & clutch size var., test optim. egg size theory) 290–297; *Eleutherodactylus skydmainos* n. sp. (size, #) 388–394; *Rhincodon typus* (embryos & egg cases from dead female) 444–446; *Chiasmodon leucosticta* (distrib. in bubble nests) 585–588; *Batrachoseps (nigritensis, wrighti)* (size, # in nests, commun. nests in *B. nigritensis*) 697–705; *Cyclura nubila* (eff. of incub. temp., water avail. & matern. age on embryos & hatchlings) 766–776; *Terrapene ornata luteola* (opt. egg size theory tested, clutch size rel. to matern. size) 819–826; *Sceloporus (scalaris, aeneus, undulatus, virgatus)* (eff. of low temps. on eggs, high & low elev. popns. compared) 827–833; *Crocodylus johnstoni* (detected by ultrasonogram, wild popn.) 851–857.

**ENDANGERED SPECIES.** *Rana (pretiosa, luteiventris)* (subsp. of cryptic sp. endang.) 1–8; *Ctenosaura (melanosterna* n. sp., *palearis, bakeri, oedirhina*) (very restricted ranges, some known popns. extinct) 138–150; *Eurycea junaluska* (disjunct distrib., very low popn. dens.) 210–215; *Phrynobatrachus rufipes* (depends on palm seeds, deforest. endngns.) 216–219; *Spicospina* n. gen. *flammeoerulea* n. sp. (very limited range, relic sp.) 373–381; *Etheostoma tecumsehi* n. sp. (limited range, threatened) 496–522; *Gopherus agassizii* (threat. sp., conserv. mngrmnt. recomms.) 523–530; *Pungitius hellenicus* (very limited range in Greece) 558–564; *Boophis xerophilus* n. sp. (limited hab., Madagascar) 572–578; *Xenopus laevis*, *Eucyclogobius newberryi* (introd. frog preys on endgrd. goby) 589–592; *Cyclura nubila* (incub. temp. aff. hatchlg. growth) 766–776.

**EVOLUTION.** *Sternotherus odoratus* (select. for morph. homogen. despite genet. diverg.) 16–21; *Polypterus maculatus* (of wiping beh. in tree frogs) 88–100; *Oreochromis* (14 spp.) (sex. select. in fem. mouthbrooder spawning beh.) 188–190; *Menidia (beryllina, peninsulae, clarkhubbsi, beryllina × peninsulae)* (evol. & maint. of unisex. popn. in unisex-bisex. sp. complex) 249–259; *Malaclemys terrapin* (theories of egg size/clutch size tradeoffs not supported) 290–297; *Plethodon cinereus* (aspects of select. for territ.) 410–414; *Crotalinae* (of crotaline rattle) 485–495; *Neobatrachus (sudelli, centralis, kunapalari, aquilonius)* (of tetraploid spp., mtDNA data) 680–689; *Batrachoseps (nigritensis, wrighti)* (of breeding beh. in Plethodontids) 697–705; *Luxilus* (all spp.) (of *Luxilus* spp. groups, mtDNA data) 758–765; *Staurotypus triporcatus*, *Kinosternon leucostomum* (of aquat. respir. in turtles) 834–839; *Gambusia holbrooki* (repro. evid. for potent. evol. of optim. offspg. size) 869–874.

**FECUNDITY.** *Hexagrammos decagrammus* (mult. clutches in ovaries) 9–15; *Agkistrodon piscivorus* (higher in N. popn., large body size) 53–59;

*Malaclemys terrapin* (5-yr. egg & clutch size var.) 290–297; *Nerodia sipedon* (correction factor for rel. clutch mass deter.) 306–318; *Rhincodon typus* (300 uterine embryos from dead female) 444–446; *Cnemidophorus (lemniscatus, cryptus)* (clutch size, compare unisex. sp. to sympat. parent sp.) 745–757; *Cyclura nubila* (clutch size & egg surv. rel. to matern. size) 766–776; *Terrapene ornata luteola* (clutch size rel. to matern. size, # females reprod. rel. to spring rains) 819–826; *Crocodylus johnstoni* (clutch size rel. to body size in wild, ultrasonogram data) 851–857; *Agama (aculeata, planiceps)* (parasite load [gut parasites] not aff. fecund.) 875–880.

**FEEDING.** *Gonatodes humeralis* (sit-&-wait pred.) 32–43; *Himantura signifer* (electroreceptor distrib. rel. to feeding) 101–107; *Kinosternon leucostomum* (always aquatic) 123–130; *Labroides dimidiatus* (cleaner wrasse feeding selectiv., seas. & loc. var.) 346–355; *Plethodon cinereus* (defence of feeding territs.) 410–414; *Podarcis lilfordi* (lizard pollinator) 593–595; *Platysaurus capensis* (feeding on figs., choice experiments in wild) 811–818; *Dasyatis brevicaudata* (lat. line detects water jets from clams) 881–883.

**FOOD.** *Gonatodes humeralis* (geogr. var. in diet, not rel. to body size var.) 32–43; *Etheostoma (Nothonotus) denoncourti* n. sp. (notes on diet) 116–122; *Phrynobatrachus rufipes* (diet from fecal anal., mostly palm seeds, endngnd. sp.) 216–219; *Labroides dimidiatus* (cleaner wrasse diet, feeding selectiv., seas. & loc. var.) 346–355; *Eleutherodactylus skydmainos* n. sp. (stom. conts.) 388–394; *Rhincodon typus* (diet of uterine embryo after birth) 444–446; *Laertia lepida* (diet rel. to ontog. dental changes) 461–463; *Tropidurussiambare* (not rel. to territ. size) 623–628; *Cichla (intermedia, orinocensis, temensis)* (diet diff. in sympat. piscivores, seas. diff.) 690–696; *Cnemidophorus (lemniscatus, cryptus)* (stom. conts., compare popns. & unisex. sp. to sympat. parent sp.) 745–757; *Platysaurus capensis* ( facultative frugivory) 811–818.

**GENETICS.** *Sternotherus odoratus* (mtDNA diverg. w/in morph. homogen. sp.) 16–21; *Urosaurus ornatus* (gen. diverg. btwn. isol. popns., mtDNA data) 174–178; *Crystallaria asprella*, *Etheostoma* (27 spp., all subgen.), *Percina* (5 spp.) (control region of mtDNA has phylogen. signif.) 319–338; *Gopherus agassizii* (genet. distinct popns., rel. to conserv. mngrmnt., mtDNA & allozymes) 523–530; *Neobatrachus (sudelli, centralis, kunapalari, aquilonius)* (gen. rels. btwn. tetraploid & diploid spp.) 680–689; *Squatina californica* (gen. diverg. btwn. nearby popns., allozyme data) 738–744; *Luxilus* (all spp.) (mtDNA cyt b seqs., signif. of types of var., phyl. anal. of spp. groups) 758–765; *Gambusia holbrooki* (herit. of offspg. size, potent. for evol. of optim. offspg. size) 869–874.

#### GEOGRAPHIC LOCALITIES

Alabama, *Sternotherus odoratus* 16–21; *Etheostoma (Doration)* (*stigmatum, jessiae*) 60–69; *Crystallaria asprella*, *Percina* (3 spp.), *Etheostoma* (7 spp.) 265–

274; *Lutjanus campechanus* 846-850; *Fundulus* (*Zygonectes*) *notti* 858-862.

Angola, *Brycinus kingsleyae* 363-372.

Arizona, *Urosaurus ornatus* 174-178; *Sceloporus* (*scalaris*, *virgatus*) 827-833.

Arkansas, *Etheostoma* (*Doration*) *stigmaeum* 60-69; *Opheodrys aestivus* 191-194; *Etheostoma juliae* 265-274; *Etheostoma* (*fragi* n. comb., *uniporum* n. comb.) 496-522.

Australia, *Labrodes dimidiatus* (QLD) 346-355; *Spicospina* n. gen. *flammoderaea* n. sp. (WA) 373-381; *Crocodylus johnstoni* (QLD) 549-557, 851-857; *Emydura signata* (QLD) 579-584; *Neobatrachus* (*sudelli* [NSW, QLD, SA, VIC], *centralis* [SA, WA], *kunapalerai* [WA], *aquilonius* [NT, WA]) 680-689, 791-801; *Neobatrachus* (*albipes*, *fulvus*, *pelobatooides*, *pictus*, *sutor*, *wilsmorei*) 791-801.

Balearic Archipelago, *Podarcis lilfordi* 593-595.

Baltic Sea, *Pungitius pungitius* 558-564.

Belize, *Staurotypus triporcatus*, *Kinosternon leucostomum* 834-839.

Bermuda, *Anolis grahami* 421-423.

Bolivia, *Eleutherodactylus* (*Craugastor*) (*fraudator*, *pluvicanorus* n. sp.) 151-157; *Pygocentrus nattereri* 179-182; *Rhinelepis levis* = *Cochliodon levis* 227-232.

Borneo, *Leptolalax* (*gracilis* [Sar.], *dringi* [Sar.], *hamidi* n. sp. [Sar.], *arayai* n. sp. [Sab.]) 158-165.

Brazil, *Gonatodes humeralis* 32-43; *Pygocentrus* (*ternetzi*, *nattereri*) 179-182; *Phrynos rufipes* 216-219; *Plecostomus lacertus* = *Kronichthys lacertus* 227-232; *Characidium* (*serrano* n. sp., *orientale* n. sp., *occidentale* n. sp., *pterostictum*, *rachovii*, *tenue*, cf. *zebra*) 531-548; *Chiasmodon* *leucosticta* 585-588; *Tropidurus itambere* 623-628; *Stombus precrenulatus* = *Proceratophrys schirchi* 629-631; *Cnemidophorus* (*lemniscatus*, *cryptus*) 745-757.

Cabinda, *Brycinus kingsleyae* 363-372.

California, *Hexagrammos decagrammus* 9-15; *Isurus oxyrinchus* 424-428; *Xenopus laevis*, *Eucyclogobius newberryi* 589-592; *Batrachoseps nigriventris* 697-705; *Squatina californica* 738-744.

Cameroon, *Brycinus* (*kingsleyae*, *opisthotaenia*) 363-372.

Canada, *Rana* (*pretiosa* [Brit. Col.], *luteiventris* [Brit. Col., Yukon]) 1-8; *Hexagrammos decagrammus* (Brit. Col.) 9-15; *Pungitius pungitius* (Alb., Yukon) 558-564.

Colorado, freshwater stream fishes 706-724.

Congo, *Brycinus* (*kingsleyae*, *opisthotaenia*) 363-372.

Cuba, *Cyclura nubila* 766-776.

Ecuador, *Gonatodes humeralis* 32-43; *Pygocentrus* (*nattereri*) 179-182.

Equatorial Guinea, *Brycinus* (*kingsleyae*, *opisthotaenia*) 363-372.

Florida, *Sternotherus odoratus* 16-21; *Etheostoma* (*Doration*) *stigmaeum* 60-69; *Dasyatis sabina* 220-223; *Rivulus marmoratus* 596-600; *Fundulus* (*Zygonectes*) (*escambiae*, *lineolatus*, *chrysotus*) 858-862.

Gabon, *Brycinus* (*kingsleyae*, *opisthotaenia*) 363-372.

Georgia, *Sternotherus odoratus* 16-21; *Etheostoma* (*Doration*) *jessiae* 60-69.

Greece, *Pungitius hellenicus* 558-564.

Guatemala, *Ctenosaura palearis* 138-150.

Honduras, *Ctenosaura* (*melanosterna* n. sp., *bakeri*, *oedirhina*) 138-150.

Idaho, *Rana luteiventris* 1-8.

Illinois, *Trachemys scripta elegans*, *Chelydra serpentina* 166-173; *Etheostoma gracile* 265-274; *Trachemys scripta* 339-345; *Etheostoma spectabile* 496-522.

India, *Polypedates maculatus* 88-100; *Solenostomus tetricorhynchus* = *Macrorhamphosodes platycheilus* 888-889.

Indiana, *Nerodia sipedon* 306-318; *Etheostoma spectabile* 496-522; *Pungitius pungitius* 558-564.

Iowa, *Etheostoma spectabile* 496-522.

Ireland, *Pungitius pungitius* 558-564.

Japan, *Pungitius pungitius* 558-564; *Hemibarbus barbus* 620-622.

Kansas, *Cretosyrphina mantelli* (fossil) 233-235; *Etheostoma spectabile* 496-522.

Kentucky, *Etheostoma* (*Doration*) *stigmaeum* 60-69; *Phoxinus cumberlandensis* × *Semotilus atromaculatus* 204-209; *Etheostoma* (*spectabile*, *bison* n. sp., *tecumsehi* n. sp., *kantuckeense* n. sp.) 496-522.

Louisiana, *Sternotherus odoratus* 16-21; *Etheostoma* (*Doration*) *stigmaeum* 60-69; *Fundulus* (*Zygonectes*) (*notti*, *dispar*, *blairae*, *olivaceus*) 858-862.

Madagascar, *Boophis xerophilus* n. sp., *Polypedates tephraemystax* = *Boophis tephraemystax*, *Rhacophorus doulioti* = *Boophis doulioti* 572-578.

Malaysia, *Leptolalax* (*heteropus* [Penin.], *gracilis* [Sar.], *dringi* [Sar.], *hamidi* n. sp. [Sar.], *arayai* n. sp. [Sab.]) 158-165.

Maryland, *Malaclemys terrapin* 290-297.

Mexico, *Sceloporus grammicus* (Mex.) 108-115; *Kinosternon leucostomum* (Vera Cruz) 123-130; *Sceloporus aeneus* (Mex.) 827-833.

Michigan, *Etheostoma spectabile* 496-522.

Mississippi, *Sternotherus odoratus* 16-21; *Etheostoma* (*Doration*) *stigmaeum* 60-69; *Fundulus* (*Zygonectes*) *notti* 858-862.

Missouri, *Sternotherus odoratus* 16-21; *Trachemys scripta elegans* 166-173; *Etheostoma* (6 spp.) 265-274; *Etheostoma* (*fragi* n. comb., *uniporum* n. comb., *burri* n. sp., *spectabile*) 496-522; *Fundulus* (*Zygonectes*) *sciadicus* 858-862.

Montana, *Rana luteiventris* 1-8.

Namibia, *Agama* (*aculeata*, *planiceps*) 875-880.

Nebraska, *Chelydra serpentina* 884-887.

Nevada, *Rana luteiventris* 1-8; *Gopherus agassizii* 523-530, 802-810.

New Jersey, *Ophidion marginatum* 610-612.

New Mexico, *Urosaurus ornatus* 174-178; *Terrapene ornata* *luteola* 819-826; *Cnemidophorus tesselatus* 863-868.

New York, *Hyla versicolor* 356-362.

North Carolina, *Sternotherus odoratus* 16-21; *Etheostoma* (*Doration*) *jessiae* 60-69; *Desmognathus quadramaculatus* 131-137; *Eurycea wilderae* 131-137, 439-443; *Eurycea junaluskae* 210-215.

Ohio, *Etheostoma spectabile* 496-522.

Oklahoma, *Crotaphytus collaris* *collaris* 565-571.

Oregon, *Rana* (*pretiosa*, *luteiventris*) 1-8; *Batrachoseps wrighti* 697-705.

Palau Is., *Platymantis pelewensis* 183-187.

Panama, *Physalaemus pustulosus* 447-450.

Papua New Guinea, *Platymantis papuensis* 183-187; *Hoplolatilus pohle* n. sp. 382-387.

Paraguay, *Pygocentrus ternetzi* 179-182.

Pennsylvania, *Pseudacris crucifer* 260-264.

Peru, *Pygocentrus nattereri* 179-182; *Monistiancistrus carachama* = *Pseudorinelepis carachama* 227-232; *Eleutherodactylus (skydmairnos* n. sp., *karcharias* n. sp.) 388-394.

Philippines, *Platymantis dorsalis* 183-187.

Poland, *Pungitius pungitius* 558-564.

Puerto Rico, *Gramma loredo* 22-31.

Rhode Island, *Anguilla rostrata* 415-420.

Romania, *Pungitius platygaster* 558-564.

Russia, *Pungitius (pungitius, platygaster)* 558-564.

Rwanda, *Xenopus wittii* 601-609.

South Africa, *Platysaurus capensis* 811-818.

South Carolina, *Sternotherus odoratus* 16-21; *Alligator mississippiensis* 224-226; *Eumeces laticeps* 613-619; *Gambusia holbrooki* 869-874.

Spain, *Lacerta lepida* 461-463; *Podarcis tilfordi* 593-595.

Sweden, *Lacerta agilis* 456-460.

Switzerland, *Rana (lessonae, esculenta = lessonae × ridibunda)* 275-283.

Taiwan, *Rhincodon typus* 444-446.

Tennessee, *Etheostoma (Doration) (stigmaeum, jessiae)* 60-69; *Etheostoma (Nothonotus) denoncourti* n. sp. 116-122; *Phoxinus tennesseensis* × *Semotilus atromaculatus* 204-209; *Etheostoma* (7 spp.) 265-274; *Etheostoma (bison* n. sp., *kantuckeense* n. sp.) 496-522.

Texas, *Cyprinodon variegatus* 77-87; *Urosaurus ornatus* 174-178; *Menidia (beryllina, peninsulae, clarkhubbsi, beryllina × peninsulae)* 249-259; *Cophosaurus texanus* 725-737.

Thailand, *Himantura signifer* 101-107.

Utah, *Rana luteiventris* 1-8; *Gopherus agassizii* 523-530.

Venezuela, *Tupinambis teguixin* 200-203; *Cichla (intermedia, orinocensis, temensis)* 690-696.

Vietnam, *Rana cf. blythii* 464-465.

Virginia, *Sternotherus odoratus* 16-21; *Agiistrodon piscivorus* 53-59; *Etheostoma (Doration) jessiae* 60-69; *Plethodon cinereus* 70-76, 410-414; *Etheostoma (Nothonotus) denoncourti* n. sp. 116-122; *Etheostoma* (3 spp.) 265-274; *Sceloporus undulatus* 827-833.

Washington, *Rana (pretiosa, luteiventris)* 1-8.

Wyoming, *Rana luteiventris* 1-8.

Zaire, *Brycinus kingsleyae* 363-372.

**GROWTH.** *Dermogenys* sp. (& dev. of andropodium rel. to body growth) 44-52; *Desmognathus quadramaculatus*, *Eurycea wilderae* (eff. of pred. on prey growth) 131-137; *Crotaphytus mantelli* (bands on vert. centra, fossil shark) 233-235; *Rhincodon typus* (of uterine embryo after birth) 444-446; *Lacerta agilis* (rate rel. to male breeding color var.) 456-460; *Cyclura nubila* (eff. of incub. temp. & water avail. on hatchlg. growth) 766-776.

**HABITAT.** *Hexagrammos decagrammus* (of nests) 9-15; *Conatodes humeralis* (hab. & microhab. shifts) 32-43; *Etheostoma (Doration) (stigmaeum, jessiae)* (of egg-laying, larvae) 60-69; *Kinosternon leucostomum* (hab. use, terrest. & aquat., radiotelem.) 123-130; *Ctenosaura (melanosterna* n. sp., *bakeri*, *oedirhina*) (notes) 138-150; *Eleutherodactylus* (*Craugastor*) (*fraudator, pluvianorus* n. sp.) (notes) 151-157; *Phoxinus tennesseensis* × *Semotilus atromaculatus*, *P. cumberlandensis* × *S. atromaculatus* (natural hybrids possibly due to hab. alter.) 204-209; *Menidia (beryllina, peninsulae, clarkhubbsi, beryllina × peninsulae)* (hab. segreg., unisex-bisex. sp. complex) 249-259; *Spicospina* n. gen. *flammoaerulea* n. sp. (notes) 373-381; *Hoplolatilus pohle* n. sp. (deep reef) 382-387; *Eleutherodactylus (skydmairnos* n. sp., *karcharias* n. sp.) (notes) 388-394; *Rana cf. blythii* (microhab. of nesting) 464-465; *Etheostoma (fragi* n. comb., *uniporum* n. comb., *burri* n. sp., *spectabile*, *bison* n. sp., *tecumsehi* n. sp., *kantuckeense* n. sp.) (all spp. same hab.) 496-522; *Characidium (serrano* n. sp., *orientale* n. sp., *occidentale* n. sp., *pterostictum, rachovii, tenuis*, cf. *zebra*) (notes) 531-548; *Boophis xerophilus* n. sp. (restricted to dry forest, unique for genus) 572-578; *Hemibarbus barbus* (microhab. of spawning) 620-622; *Cichla (intermedia, orinocensis, temensis)* (microhab. diff. btwn. sympat. piscivores) 690-696; *Cophosaurus texanus* (thermal constraints in microhab. choice) 725-737; *Squatina californica* (deep channel forms barrier btwn. nearby popns.) 738-744; *Cnemidophorus (lemniscatus, cryptus)* (compare popns. & unisex. sp. to sympat. parent sp.) 745-757; *Sceloporus (scalaris, aeneus, undulatus, virgatus)* (eff. of low temps. on eggs, high & low elev. popns. compared) 827-833; *Lutjanus campechanus* (fish stay on artificial reefs, ultrason. tracking) 846-850.

**HERMAPHRODITISM.** *Gramma loredo* (expected protogyny not found) 22-31; *Rivulus marmoratus* (diandric protogynous herm.) 596-600.

**HIBERNATION.** *Agiistrodon piscivorus* (surv. rel. to lipid reserves, body size & temp.) 53-59; *Kinosternon leucostomum* (aestiv. sites rel. to home range) 123-130; *Pseudacris crucifer* (freeze duration import. in surv.) 260-264.

**HISTOLOGY.** *Gramma loredo* (gonad hist. confirms lack of protogyny) 22-31; *Dermogenys* sp. (dev. of testis & andropodium) 44-52; *Polypedates maculatus* (of secretions in wiping beh. in tree frogs) 88-100; *Himantura signifer* (of electoreceptors in freshwater stingray) 101-107; *Anguilla rostrata* (gonad gender, anat. & hist.) 415-420; *Cheiromontinae* (8 spp.) (hist. evid. of intern. fert.) 433-438; *Rivulus marmoratus* (hist. evid. for diandric protogynous hermaph.) 596-600.

**HOME RANGE.** *Plethodon cinereus* (scent-marking & territ.) 70-76; *Kinosternon leucostomum* (activ. area, aestiv. & nest sites, radiotelem.) 123-130; *Plethodon cinereus* (aspects of territ. beh.) 410-414; *Anolis grahami* (territ. response to video playback in wild) 421-423; *Eurycea wilderae* (territ. beh., aquat. larv. in lab) 439-443; *Hemibarbus barbus* (male territ. during spawning) 620-622; *Tropidurus itambere* (seas., gender diff., rel. to reprod., territ. defence) 623-628; *Lutjanus campechanus* (fish stay on artificial reefs, ultrason. tracking) 846-850.

**HYBRIDIZATION.** *Phoxinus tennesseensis* × *Semotilus atromaculatus*, *P. cumberlandensis* × *S. atromaculatus*

(natural hybrids, first records) 204-209; *Menidia* (*beryllina*, *peninsulae*, *clarkhubbsi*, *beryllina*  $\times$  *peninsulae*) (interrel. of hybrids, hybrid origin, unisex-bisex. sp. complex) 249-259; *Rana* (*lessonae*, *esculenta* = *lessonae*  $\times$  *ridibunda*) (fem. mate choice in maint. hybrid sp. in popn.) 275-283; *Brycinus* (*kingsleyae*, *opisthototaenia*) (some intermed. specimens in sympatry) 363-372; *Neobatrachus* (all 10 spp.) (poss. origin of tetraploid spp. from diploid spp.) 791-801.

IMMUNOLOGY, *Amphiprion* (*clarkii*, *ocellaris*, *periderion*) (anemone antigens in anemonefish mucus) 284-289.

LARVAE, *Etheostoma* (*Doration*) (*stigmaeum*, *jessiae*) (ontogen. traits as system. charcs. hab. of larvae) 60-69; *Desmognathus quadramaculatus*, *Eurycea wilderae* (eff. of pred. on prey growth, surv. & metamorph.) 131-137; *Eurycea junaluska* (larvae disting. from sympat. congeners by color) 210-215; *Eurycea wilderae* (agon. & spacing beh. in lab) 439-443.

LATERAL LINE, *Dasyatis brevicaudata* (detects water jets from clams) 881-883.

LIFE HISTORY, *Etheostoma* (*Doration*) (*stigmaeum*, *jessiae*) (early life hist. traits as system. charcs.) 60-69; *Etheostoma* (*Nothonotus*) *denoncourti* n. sp. (notes) 116-122; *Desmognathus quadramaculatus*, *Eurycea wilderae* (eff. of pred. on prey life hist.) 131-137; *Urosaurus ornatus* (gen. diverg. btwn. isol. popns. rel. to life hist. var.) 174-178; *Malaclemys terrapin* (5-yr. egg & clutch size var.) 290-297; *Cophosaurus texanus* (thermal constraints in microhab. choice, possible life hist. conseqs.) 725-737; *Cnemidophorus* (*lemniscatus*, *cryptus*) (compare popns. & unisex. sp. to sympat. parent sp.) 745-757.

LIGHT, *Phalaenoides pustulosus* (levels aff. female mate choice) 447-450; *Crotaphytus collaris collaris* (brightness of body color, sex. dichrom.) 565-571.

LOCOMOTION, *Ophedrys aestivus* (gravitid red. crawl speed) 191-194; *Xenopus wittii* (swimming & postures during mating) 601-609; *Hemibarbus barbus* (loc. & posture during spawning) 620-622; *Chelydra serpentina* (juvs. use of tails in terrest. loc.) 884-887.

METHODS, turtles (eff. of meth. on diff. in reported twinning rates) 166-173; *Pygocentrus* (*ternetzi*, *nattereri*) (modif. truss anal. improves shape info.) 179-182; *Betta splendens* (computer anim. for study of resp. to vis. stim.) 195-199; *Nerodia sipedon* (correction factor for rel. clutch mass deter.) 306-318; *Elaeophis obsoleta* (cardiopulm. eff. of anesthetic ketamine HCl on snakes) 395-400; *Anguilla rostrata* (sex determ. of silver phase eels) 415-420; *Anolis grahami* (video playback in wild) 421-423; freshwater stream fishes (natural var. in stream fish assemblages, import. of data scale) 706-724; *Cophosaurus texanus* (meas. temper. by microhab. w/ diel ptns.) 725-737; preserved fishes (cyanine blue, stain for surface features,

small specimens) 840-841; *Trachemys scripta*, *Deirochelys reticularia* (using claws to age turtles) 842-845; *Lutjanus campechanus* (ultrason. tracking of fish) 846-850; *Crocodylus johnstoni* (ultrasonogram to assess repro. stat. in wild popn.) 851-857.

MITOCHONDRIAL DNA, *Hexagrammos decagrammus* (to ident. matern. of eggs) 9-15; *Sternotherus odoratus* (mtDNA diverg. w/ morph. homogen. sp.) 16-21; *Urosaurus ornatus* (mtDNA diverg. btwn. isol. popns. rel. to ecol. & life hist. var.) 174-178; *Brachyrhaphis* (9 spp.), *Gambusia* (3 spp.), *Belonesox belizanus* (clad. anal. mtDNA data) 298-305; *Crystallaria asprella*, *Etheostoma* (27 spp., all subgen.), *Percina* (5 spp.) (control region of mtDNA has phylogen. signif.) 319-338; *Agiptodon* (*halys*, *contortrix*), *Lachesis muta*, *Crotalus viridis* (in phyl. anal.) 429-432; *Gopherus agassizii* (genet. distinct popns., rel. to conserv. mgmnt.) 523-530; *Neobatrachus* (*sudelli*, *centralis*, *kunapalari*, *aquilonius*) (in anal. of origins of tetraploid spp.) 680-689; *Luxilus* (all spp.) (cyt b seqs., phyl. anal., rels. btwn. spp. groups) 758-765; *Fundulus* (*Zygogetes*) (*nottii*, *escambiae*, *lineolatus*, *dispar*, *blairae*, *sciadicus*, *olivaceus*, *chrysotus*) (cyt b seqs., phyl. anal. of *F. notti* sp. group) 858-862.

MORPHOLOGY, *Sternotherus odoratus* (morph. homogen. despite genet. diverg.) 16-21; *Himantura signifer* (of electroreceptors in freshwater stingray) 101-107.

NESTING, *Hexagrammos decagrammus* (mult. matern. in nest, nest descrip. & hab.) 9-15; *Gonatodes humeralis* (descrip., multi-spp. nests) 32-43; *Kinosternon leucostomum* (nest sites rel. to home range, seas., microhab.) 123-130; *Phoxinus tennesseensis*  $\times$  *Semotilus atromaculatus*, *P. cumberlandensis*  $\times$  *S. atromaculatus* (natural hybrids due to communal nesting) 204-209; *Trachemys scripta* (hatchlgs. overwinter in nests, rel. to freeze resist. & distrib.) 339-345; *Rana* cf. *blythi* (descrip., microhab.) 464-465; *Chiasmocleis leucosticta* (bubble nests, unique for anurans) 585-588; *Batrachoseps* (*nigrovittatus*, *wrighti*) (commun. nests, lack parent. care) 697-705; *Cyclura nubila* (eff. of incub. temp. & water avail. on hatchl. growth) 766-776; *Gopherus agassizii* (chem. cues in burrow choice) 802-810; *Sceloporus* (*scalaris*, *aeneus*, *undulatus*, *virgatus*) (eff. of low temps. on eggs, high & low elev. popns. compared) 827-833.

NOMENCLATURE, *Monistiancistrus carachama* = *Pseudorinelepis carachama*, *Plecostomus lacerta* = *Kronichthys lacerta*, *Rhinelepis levis* = *Cochliodon levis* (generic reassess.) 227-232; *Boophis xerophilus* n. sp., *Polypedetes tephraeomystax* = *Boophis tephraeomystax*, *Rhacophorus doulioti* = *Boophis doulioti* (n. sp., lectotypes design. for others, nomen. anal. of sp. complex) 572-578; *Stombus pcrenulatus* = *Proceratophrys schirchi* (previous valid name) 629-631; *Solenostomus tuticoriensis* = *Macrorhamphosodes platycheilus* 888-889.

OLFACTION, *Plethodon cinereus* (scent-marking & olf. beh. in territor.) 70-76; *Gopherus agassizii* (chem. cues in burrow choice) 802-810.

OSTEOLOGY, *Dermogenys* sp. (in dev. of andropodium) 44-52; *Cretoxyrhina mantelli* (bands on vert. centra, fossil shark) 233-235; *Spicospina* n. gen. *flammatocera* n. sp. (descript.) 373-381; *Eleutherodactylus skydmainsis* n. sp. (descript.) 388-394; *Pungitius* (*hellenicus*, *pungitius*, *platygaster*) (supports valid. of *P. hellenicus*) 558-564; *Poeciliini* (*Limia*, *Pamphorichthys*, *Xiphophorus*, *Poecilia*, *Alfaro*, *Priapella*) (rel. to gonapodium, in clad. anal.) 663-679; *Ictalurus punctatus* (sound product. mech.) 777-790.

PALEONTOLOGY, *Cretoxyrhina mantelli* (late Cret., bands on vert. centra, possible age & growth info.) 233-235.

PARASITES, *Eleutherodactylus* (*Craugastor*) *fraudator* (dermal) 151-157; *Labroides dimidiatus* (cleaner wrasse diet mostly fish ectoparasites) 346-355; *Xenopus laevis* (African parasites introd. with frog) 589-592; *Agama* (*aculeata*, *planiceps*) (gut nematodes infect. rates var. by hab., eff. on hosts) 875-880.

PAROTOID GLAND, *Spicospina* n. gen. *flammatocera* n. sp. (massive) 373-381.

PARTHENOGENESIS, *Cnemidophorus* (*lemniscatus*, *cryptus*) (parth. unisex. sp. *C. cryptus*, ecol. diffs. from sympat. parent sp.) 745-757; *Cnemidophorus tesselatus* (repro. & size diffs. btwn. sympat. pattern classes of parthen. sp.) 863-868.

PHEROMONES, *Plethodon cinereus* (scent-marking & territ. beh.) 70-76; *Gopherus agassizii* (chem. cues in burrow choice) 802-810.

PHYLOGENETIC ANALYSIS, *Dermogenys* sp. (morph. of andropodium for phylogen. charcs.) 44-52; *Etheostoma* (*Doration*) (*stigmaeum*, *jessiae*) (ontogen. traits as system. charcs.) 60-69; *Ctenosaura* (*melanosterna* n. sp., *palearis*, *bakeri*, *oedirhina*) (evid. for clade) 138-150; *Eleutherodactylus* (*Craugastor*) (*fraudator*, *pluvicanorus* n. sp.) (sister spp., clad. anal. of jaw muscles) 151-157; *Crystallaria asprella*, *Percina* (3 spp., 3 subgen.), *Etheostoma* (22 spp., 15 subgen.) (clad. anal., allozymes) 265-274; *Brachyrhaphis* (9 spp.), *Gambusia* (3 spp.), *Belonesox belizanus* (clad. anal., mtDNA data) 298-305; *Crystallaria asprella*, *Etheostoma* (27 spp., all subgen.), *Percina* (5 spp.) (clad. anal. based on mtDNA control region seq.) 319-338; *Argentinoidei* (redo Begle's Argentinoidei trees w/ corrections, get diff. trees, clad. anal.) 401-409; *Akistrodon* (*halys*, *contortrix*), *Lachesis muta*, *Crotalus viridis* (clad. anal., mtDNA data) 429-432; *Poeciliini* (*Limia*, *Pamphorichthys*, *Xiphophorus*, *Poecilia*, *Alfaro*, *Priapella*) (clad. anal. of tribe, diagnose genera) 663-679; *Neobatrachus* (*sudelli*, *centralis*, *kunapalari*, *auquilonius*) (clad. anal. of tetraploid spp. & diploid rels.) 680-689; *Luxilus* (all spp.) (clad. anal., rels. btwn. spp. groups, mtDNA data) 758-765; *Fundulus* (*Zygonectes*) (*nottii*, *escambiae*, *lineolatus*, *dispar*, *blairae*, *sciadicus*, *olivaceus*, *chrysotus*) (clad. anal. *F. notti* sp. group, mtDNA data) 858-862.

PHYSIOLOGY, *Akistrodon piscivorus* (lipid reserve

seas. var., rel. to body size, reprod., & hibern.) 53-59; *Cyprinodon variegatus* (extreme temp. range toler.) 77-87; *Polypedates maculatus* (wiping beh. in water conserv.) 88-100; *Tupinambis teguixin* (met. rate in wild trop. lizard, seas. var.) 200-203; *Pseudacris crucifer* (duration of freeze toler. import.) 260-264; *Hyla versicolor* (energy source for calling) 356-362; *Elaphe obsoleta* (cardiopulm. eff. of anesthetic ketamine HCl on snakes) 395-400; *Isurus oxyrinchus* (cardiovasc. physiol. in swimming sharks) 424-428; *Staurotypus triporcatus*, *Kinosternon leucostomum* (air & aquat. respir., gas exch. rates) 834-839.

POLLINATION, *Podarcis tilfordi* (lizard pollinator) 593-595.

POPULATIONS, *Sternotherus odoratus* (mtDNA diffs. btwn. morph. sim. popns.) 16-21; *Gramma loreto* (popn. charcs. suggest protogyny, none found) 22-31; *Gonatodes humeralis* (geogr. var. in hab., size, morph. & prey size) 32-43; *Akistrodon piscivorus* (N. popn. large body size rel. to lipid reserves) 53-59; *Urosaurus ornatus* (gen. diverg. btwn. isol. popns. rel. to ecol. & life hist. var.) 174-178; *Menidia* (*beryllina*, *peninsulae*, *clarkhubbsi*, *beryllina* × *peninsulae*) (main. of sympat. popns., unisex.-bisex. sp. complex) 249-259; *Rana* (*lessonae*, *esculenta* = *lessonae* × *ridibunda*) (female choice in maint. of mixed hybrid sp. & parental sp. in popn.) 275-283; *Gopherus agassizii* (genet. distinct popns., rel. to conserv. mngrmnt.) 523-530; *Crotaphytus collaris collaris* (popn. var. in sex. dichrom.) 565-571; *Cichla* (*intermedia*, *orinocensis*, *temensis*) (ecol. of popns. of sympat. piscivores, 3 spp. in one area, 2 spp. in other) 690-696; *Cophosaurus texanus* (var. btwn. popns. of thermal constraints in microhab. choice, possible life hist. conseqs.) 725-737; *Squatina californica* (genet. diverg. btwn. nearby popns., allozyme data) 738-744; *Cnemidophorus* (*lemniscatus*, *cryptus*) (ecol. diffs., compare popns. & unisex. sp. to sympat. parent sp.) 745-757; *Sceloporus* (*scalaris*, *aeneus*, *undulatus*, *virgatus*) (eff. of low temps. on eggs, high & low elev. popns. compared) 827-833.

POSTCLOACAL GLANDS, *Plethodon cinereus* (in scent-marking) 70-76.

PREDATION, *Gonatodes humeralis* (sit-& wait pred., geogr. var. in prey size) 32-43; *Himantura signifer* (electroreceptor distrib. rel. to pred. beh.) 101-107; *Desmognathus quadramaculatus*, *Eurycea wilderae* (eff. of pred. on prey life hist.) 131-137; *Ophedrys aestivus* (gravitid red. crawl speed, increases pred.) 191-194; *Labroides dimidiatus* (cleaner wrasse loc. & seas. var. in prey) 346-355; *Physalaemus pustulosus* (light level & pred. risk) 447-450; *Lacerta lepida* (prey diffs. rel. to ontogen. dental changes) 461-463; *Crotalinae* (evol. of crotaline rattle) 485-495; *Xenopus laevis*, *Eucyclogobius newberryi* (introd. frog preys on endgrd. goby) 589-592; *Eumeces laticeps* (antipred. beh. ptms. rel. to pred. orient.) 613-619; *Cichla* (*intermedia*, *orinocensis*, *temensis*) (prey diffs. in sympat. piscivores, seas. diffs.) 690-696; *Cnemidophorus* (*lemniscatus*, *cryptus*) (prey size,

compare popns. & unisex. sp. to sympat. parent sp.) 745-757.

REPRODUCTION, *Hexagrammos decagrammus* (nesting, matern. of eggs in nest) 9-15; *Gramma loreto* (expected protogyny not found) 22-31; *Gonatodes humeralis* (size at matur., fecund., egg # & stage, nests) 32-43; *Agkistrodon piscivorus* (rel. to lipid reserves, body size, hibern. temp.) 53-59; *Etheostoma (Doration) (stigmatum, jessiae)* (mating beh., egg-laying) 60-69; *Sceloporus grammicus* (hypothesis for difs. in therm. reg. in gravid fems.) 108-115; *Etheostoma (Nothonotus) denoncourti* n. sp. (notes) 116-122; *Kinosternon leucostomum* (seas., nest sites nocturn., nest microhab.) 123-130; *Ctenosaura melanosterna* n. sp. (notes on seas., eggs) 138-150; *Trachemys scripta elegans*, *Chelydra serpentina* (twinning rates, survival, disadvantage) 166-173; *Oreochromis* (14 spp.) (spawning beh. in fem. mouthbrooders, male compet.) 188-190; *Ophreodrys aestivus* (gravidity red. crawl speed) 191-194; *Phoxinus tennesseensis*  $\times$  *Semotilus atromaculatus*, *P. cumberlandensis*  $\times$  *S. atromaculatus* (natural hybrids due to communal spawning) 204-209; *Rana (lessonae, esculenta = lessonae  $\times$  ridibunda)* (fem. mate choice in maint. hybrid sp. in popn.) 275-283; *Malaclemys terrapin* (5-yr. egg & clutch size var.) 290-297; *Nerodia sipedon* (correction factor for rel. clutch mass deter.) 306-318; *Spicospina* n. gen. *flammeocerulea* n. sp. (notes) 373-381; *Eleutherodactylus skydmainos* n. sp. (notes) 388-394; *Cheirodoninae* (8 spp.) (histol. evid. of intern. fert.) 433-438; *Rhincodon typus* (embryos & egg cases from dead female) 444-446; *Physalaemus pustulosus* (female mate choice, aff. by light levels) 447-450; *Lacerta agilis* (var. in male breeding colors) 456-460; *Rana cf. blythi* (nesting, calls, mating, male-male aggres.) 464-465; *Chiasmocleis leucosticta* (bubble nests, unique for anurans) 585-588; *Rivulus marmoratus* (diandric protogynous hermaph.) 596-600; *Xenopus wittii* (mating beh. in wild-caught frogs) 601-609; *Ophidion marginatum* (sounds during ctshp. & spawning) 610-612; *Hemibarbus barbus* (spawning beh. in wild) 620-622; *Tropidurus itambere* (territ. size var. with repro. seas.) 623-628; *Cichla (intermedia, orinocensis, temensis)* (repro. seas.) 690-696; *Batrachoseps (nigriventris, wrighti)* (commun. nests, lack parent. care) 697-705; *Cnemidophorus (lemniscatus, cryptus)* (clutch size, compare unisex. sp. to sympat. parent sp.) 745-757; *Cyclura nubila* (fecund., incub. temp. aff. hatchl. growth) 766-776; *Gopherus agassizii* (chem. cues in burrow choice dur. repro. seas.) 802-810; *Terrapene ornata luteola* (seas., rel. to rainfall, size at matur., clutch size & freq., opt. egg size theory tested, compared to *T. o. ornata*) 819-826; *Sceloporus (scalaris, aeneus, undulatus, virgatus)* (eff. of low temps. on eggs, high & low elev. popns. compared) 827-833; *Crocodylus johnstoni* (ultrasonogram to assess repro. stat. in wild popn.) 851-857; *Cnemidophorus tesselatus* (repro. & size difs. btwn. sympat. pattern classes of parthen. sp.) 863-868; *Gambusia holbrooki* (repro. evid. for potent. evol. of optim. offsp. size) 869-874.

RESPIRATION, *Alligator mississippiensis* (make air

holes during brief ice cover) 224-226; *Pseudacris crucifer* (in postfreeze recovery) 260-264; *Hyla versicolor* (resp. quot. indicates energy source for calling) 356-362; *Elaphe obsoleta* (eff. of anesthetic ketamine HCl on snakes) 395-400; *Staurotypus triporcatus*, *Kinosternon leucostomum* (air & aquat. respir., beh. & gas exch. rates) 834-839.

SALINITY, *Dasyatis sabina* (spine replcmnt. in freshwater popn. same as marine popns.) 220-223.

SEX, *Gonatodes humeralis* (gender & age color difs.) 32-43; *Menidia (beryllina, peninsulae, clarkhubbsi, beryllina  $\times$  peninsulae)* (pittns. of abund., unisex-bisex. sp. complex) 249-259; *Anguilla rostrata* (sex determ. of silver phase eels, lopsided sex ratios) 415-420; *Alligatoridae* (6 spp.), *Crocodylidae* (7 spp.) (sex ratios, literature sum.) 451-455; *Rivulus marmoratus* (age-rel. gender changes, hermaph.) 596-600.

SEXUAL DIMORPHISM, *Gramma loreto* (size dimorph. suggests protogyny, none found) 22-31; *Gonatodes humeralis* (color dimorph.) 32-43; *Eleutherodactylus skydmainos* n. sp. (males smaller) 388-394; *Anguilla rostrata* (body size, in silver phase eels) 415-420; *Rana cf. blythi* (rel. to male-male aggres.) 464-465; *Characidium rachovii* (male fins larger) 531-548; *Crotaphytus collaris collaris* (geogr. var. in sex. dichrom.) 565-571; *Tropidurus itambere* (body size & home range) 623-628.

SIZE, *Hexagrammos decagrammus* (ovarian eggs) 9-15; *Gramma loreto* (size dimorph. suggests protogyny, none found) 22-31; *Gonatodes humeralis* (body size, rel. to egg size, prey size, geogr. var.) 32-43; *Agkistrodon piscivorus* (body size rel. to lipid reserves) 53-59; *Trachemys scripta elegans* (twinning rates rel. to size of mother) 166-173; *Platymantis (pelewenensis, dorsalis, papuanus)* (closest rels. differ in size) 183-187; *Malaclemys terrapin* (5-yr. egg & clutch size var.) 290-297; *Nerodia sipedon* (correction factor for rel. clutch mass deter.) 306-318; *Anguilla rostrata* (sex. dimorph. in silver phase eels) 415-420; *Eurycea wilderae* (larv. agon. beh. rel. to body size) 439-443; *Rhincodon typus* (of uterine embryos & egg cases) 444-446; *Cichla (intermedia, orinocensis, temensis)* (difs. btwn. sympat. piscivores) 690-696; *Cnemidophorus (lemniscatus, cryptus)* (body size & prey size, compare popns. & unisex. sp. to sympat. parent sp.) 745-757; *Terrapene ornata luteola* (opt. egg size theory tested, clutch size rel. to matur. size) 819-826; *Cnemidophorus tesselatus* (repro. & size difs. btwn. sympat. pattern classes of parthen. sp.) 863-868.

SOUNDS, *Ophidion marginatum* (during ctshp., sonograms) 610-612; *Ictalurus punctatus* (anat. of pectoral spine & locking rel. to sound product.) 777-790.

SURVIVAL, *Agkistrodon piscivorus* (lipid reserve & body size rel. to hibern. surv.) 53-59; *Cyprinodon variegatus* (at extreme temperatures) 77-87; *Desmognathus quadramaculatus*, *Eurycea wilderae* (eff. of pred. on prey surv.) 131-137; *Trachemys*

*scripta elegans*, *Chelydra serpentina* (of twins) 166-173; *Alligator mississippiensis* (during brief ice cover, rel. to age) 224-226; *Pseudacris crucifer* (freeze toler. & recov., freeze duration import.) 260-264; *Trachemys scripta* (of overwintering hchlgs., rel. to distrib.) 339-345.

**SYMBIOSIS.** *Amphiprion* (*clarkii*, *ocellaris*, *perideraion*) (char. & devel. of anemonefish protect. from anemones) 284-289.

**SYSTEMATICS.** *Rana* (*pretiosa*, *luteiventris*) (cryptic spp. disting. by allozymes not morphol., rediagn.) 1-8; *Sternotherus odoratus* (genet. diverg. w/in morph. homogen. sp.) 16-21; *Etheostoma* (*Doration*) (*stigmaeum*, *jessiae*) (ontogen. traits rel. to sp. distinct.) 60-69; *Etheostoma* (*Nothonotus*) *denoncourti* n. sp. (n. sp. compar. to *E. tippecanoe*) 116-122; *Ctenosaura* (*melanosterna* n. sp., *palearis*, *bakeri*, *oedirhina*) (n. sp., evid. for clade) 138-150; *Eleutherodactylus* (*Craugastor*) (*fraudator*, *pluvianorus* n. sp.) (n. sp., sister spp., phylogen. anal.) 151-157; *Leptolalax* (*heteropus*, *gracilis*, *dringi*, *hamidi* n. sp., *arayai* n. sp.) (n. sp. based on call diff. & morph., key to Bornean spp.) 158-165; *Pygocentrus* (*ternetzi*, *nattereri*) (evid. *P. ternetzi* invalid) 179-182; *Platymantis* (*pelewensis*, *dorsalis*, *papuensis*) (phylogen. rels. btwn. spp. inferred from calls & kar.) 183-187; *Monistia* (*cistrus*) *carachama* = *Pseudorinelepis* *carachama*, *Plecostomus* *lacerta* = *Kronichthys* *lacerta*, *Rhinelepis* *levis* = *Cochliodon* *levis* (generic reassess.) 227-232; *Crystallaria* *asprella*, *Percina* (3 spp., 3 subgen.), *Etheostoma* (22 spp., 15 subgen.) (clad. anal., allozymes, mostly supports current taxon.) 263-274; *Brachyrhaphis* (9 spp.), *Gambusia* (3 spp.), *Belonesox* *belizanus* (phyl. anal., mtDNA data) 298-305; *Crystallaria* *asprella*, *Etheostoma* (27 spp., all subgen.), *Percina* (5 spp.) (phylogen. anal., mtDNA data) 319-338; *Brycinus* (*kingsleyae*, *opisthotaenia*) (redescr. spp., possible hybrid. in sympathy) 363-372; *Spicospina* n. gen. *flammoacerulea* n. sp. (phylogen. notes) 373-381; *Hoplolatilus* *poolei* n. sp. (phylogen. notes on genus) 382-387; *Eleutherodactylus* (*skydmains* n. sp., *karcharia* n. sp.) (n. sp. in *E. conspiciatus* group) 388-394; *Argentinoidae* (redo Begle's Argentinoid trees w/ corrections, get diff. trees, clad. anal.) 401-409; *Aghistodon* (*halys*, *contortrix*), *Lachesis muta*, *Crotalus viridis* (phyl. anal., mtDNA data) 429-432; *Etheostoma* (*fragi* n. comb., *uniporum* n. comb., *burni* n. sp., *spectabile*, *bison* n. sp., *tecumsehi* n. sp., *kantuckeense* n. sp.) (n. spp. from *E. spectabile*) 496-522; *Characidium* (*serrano* n. sp., *orientale* n. sp., *occidentale* n. sp., *pterostictum*, *rachovii*, *tenuis*, cf. *zebra*) (n. spp., key to spp.) 531-548; *Pungitius* (*hellenicus*, *pungitius*, *platygaster*) (valid. of *P. hellenicus*) 558-564; *Boophis* *xerophilus* n. sp., *Polypedates* *tephraeomystax* = *Boophis* *tephraeomystax*, *Rhacophorus* *doulioti* = *Boophis* *doulioti* (n. sp., lectotypes design. for others) 572-578; *Poeciliini* (*Limia*, *Pamphorichthys*, *Xiphophorus*, *Poecilia*, *Alfaro*, *Priapella*) (phyl. anal. of tribe, rediagnose genera) 663-679;

*Neobatrachus* (*sudelli*, *centralis*, *kunapalarai*, *auquilonius*) (phyl. anal. of tetraploid spp., conflicts w/ current taxon.) 680-689; *Luxilus* (all spp.) (phyl. anal., rels. btwn. spp. groups) 758-765; *Fundulus* (*Zygoctes*) (*nottii*, *escambiae*, *lineolatus*, *dispar*, *blairae*, *sciadicus*, *olivaceus*, *chrysotus*) (phyl. anal. *F. notti* sp. group, mtDNA data) 858-862; *Cnemidophorus* *tesselatus* (repro. & size diff. btwn. sympat. pattern classes of parthen. sp., syst. implics.) 863-868.

**TEMPERATURE.** *Gonatodes humeralis* (microhab. & body temp.) 32-43; *Aghistodon piscivorus* (surv. in hibern. rel. to body size, lipid reserves & temp.) 53-59; *Cyprinodon variegatus* (exper. evid. of extreme temp. range toler.) 77-87; *Sceloporus grammicus* (hypoth. for diff. in therm. reg. in gravid fems.) 108-115; *Alligator mississippiensis* (make air holes during brief ice cover) 224-226; *Pseudacris crucifer* (freeze toler.) 260-264; *Trachemys scripta* (cold toler., freeze resist. in hchlgs., rel. to distrib.) 339-345; *Crocodylus johnstoni* (diel & seas. pttns. of thermoreg. in wild, aff. by aggres.) 549-557; *Emydura signata* (basking not raise body temp.) 579-584; *Cophosaurus texanus* (thermal constraints in microhab. choice) 725-737; *Cnemidophorus lemniscatus* (body temps., compare popns.) 745-757; *Cyclura nubila* (incub. temp. aff. hchlgs. growth) 766-776; *Sceloporus* (*scalaris*, *aeneus*, *undulatus*, *virgatus*) (eff. of low temps. on eggs, high & low elev. popns. compared) 827-833.

**TOXICITY.** *Amphiprion* (*clarkii*, *ocellaris*, *perideraion*) (of anemones to anemonefish) 284-289.

**TRUSS ANALYSIS.** *Pygocentrus* (*ternetzi*, *nattereri*) (modif. truss anal. shows cline in body shape, evid. *P. ternetzi* invalid) 179-182; *Pungitius* (*hellenicus*, *pungitius*, *platygaster*) (supports valid. of *P. hellenicus*) 558-564.

**UNISEXUAL SPECIES.** *Menidia* (*beryllina*, *peninsulae*, *clarkhubbsi*, *beryllina* × *peninsulae*) (pttns. of abund., unisex-bisex. sp. complex) 249-259; *Cnemidophorus* (*lemniscatus*, *cryptus*) (*C. cryptus*, ecol. diff. from sympat. parent sp.) 745-757.

**VARIATION.** *Gonatodes humeralis* (geogr. var. in hab., size, morph. & prey size) 32-43; *Malaclemys terrapin* (5-yr. egg & clutch size var.) 290-297; *Crotaphytus collaris* (*collaris*) (geogr. var. in sex. dichrom.) 565-571; freshwater stream fishes (natural var. in stream fish assemblages, import. of data scale) 706-724.

**VISION.** *Betta splendens* (beh. resp. to vis. stim. from computer anim.) 195-199; *Platysaurus capensis* (choice of ripe figs by color, fig feeding in wild) 811-818.

**WATER BALANCE.** *Polypedates maculatus* (rel. to wiping beh. in tree frogs) 88-100; *Tupinambis teguixin* (in wild trop. lizard, seas. var.) 200-203; *Cyclura nubila* (incub. water avail. not aff. hchlgs. growth) 766-776.

